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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/572,971

Applicant(s)

JOHNSON, WARREN THOMAS

Examiner

Denise R. Anderson

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2006.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
4a) Of the above claim(s) 12 and 13 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☐ Claim(s) 1-11 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☒ Claim(s) 1-13 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 22 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 03 December 2007.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application.
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372. This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-11, drawn to a method to backwash hollow membranes with gas.

Group II, claim(s) 12-13, drawn to a hollow membrane apparatus with gas backwashing capability.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The special technical feature is a backwash of gas in the methods claims and an apparatus for backwashing with gas in the apparatus claims. Nakatsuka (Patent Pub. No. JP11076769, Mar. 23, 1999 – The esp@cenet Abstract in English, the publication, and a machine translation to English) discloses such a gas backwashing method and apparatus in Figures 1 and 2 and the esp@cenet Abstract. As such, the claims do not show the special technical feature that makes a contribution over the prior art and, because of this, there is a lack of unity of invention under PCT Rule 13.1.

3. The examiner has required restriction between product and process claims.

Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder.

All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

4. In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

5. During a telephone conversation with Pasquale Musacchio on June 30, 2008 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. **Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

7. The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

8. Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable

over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Claim Rejections - 35 USC § 102
Nakatsuka Reference

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakatsuka (Patent Pub. No. JP11076769, Mar. 23, 1999 – The esp@cenet Abstract in English, the publication, and a machine translation to English).

11. Regarding claims 1 and 10, Nakatsuka discloses "a cleaning method of a filter membrane module" of the "hollow fiber module" type where, during filtration, a pressure differential is applied and liquid flows into the hollow fibers and permeate flows out the hollow center. Nakatsuka, esp@cenet Abstract, lines 1-2; Translation, Detailed Description, ¶ 17, lines 1-4. Nakatsuka further teaches, "In the cleaning method of the filter membrane module 11 for recovering the water permeability by cleaning the filter membrane module 22 degraded in water permeability of a membrane purifying system 10 of water with the liquid chemical, at least one point of time before and after the liquid chemical is supplied to the filter membrane module 11 or at the both point of time, a gas pressurizing process for pressurizing a gas from the permeation side of the filter membrane of the filter membrane module 1 at ≥ 20 kPa to below the bubble point is

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provided for 1-5 min.” Nakatsuka, esp@cenet Abstract, lines 9-22 and Figure 1 shown in the Abstract and the patent. Nakatsuka also discloses that, during filtration, there is a backwash using filtrate (permeated water) once every 45 minutes for one minute in Figure 1 and, in the Translation’s Detailed Description, at ¶ 20, lines 1-3 and 12-18. Referring to Figure 2, Nakatsuka teaches, “At the time of filtration . . . valve 7 is closed . . . valves 6 and 8 [are opened and] . . . river raw water . . . is supplied . . . with pump 14. . . Every 45 minutes, [the] operation . . . establishes the reverse washing process which pours permeated water for 1 minute from the penetration side of a filter membrane module, and water recovery is . . . 90%. At the time of the backwash operation, . . . valve 7 [is] opened [and] . . . valves 6 and 8 are closed . . . pump 14 [is] stopped . . . and the back wash . . . supplies some permeated water . . . at the penetration side of the filter membrane module 11 via the pump 15 with operation . . . periodically carried out.”

12. To recap, Nakatsuka discloses a method to filter raw river water using permeable, hollow fiber membranes immersed in the raw water. A pressure differential is applied across the hollow membranes and filtrate is drawn off from the center (from the hollow) of the hollow membranes. The method includes a backwash once every 45 minutes for 1 minute. The backwash uses the filtrate and is “periodically carried out,” i.e. the backwash is pulsed, as recited in claim 10.

13. Nakatsuka also discloses the recited application of a gas, during backwash, used to push the filtrate back into the bulk liquid surrounding the membranes and, thus, clean the membranes of retained solids. Nakatsuka, Figure 2 and Translation, Detailed

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Description, ¶ 23, lines 4-7. In the translation, it is stated, "[T]he air 25A which [is] . . . adjusted from the pneumatic pressure cylinder 25 to pneumatic pressure 50 kPa by the pressure regulating valve 27 . . . was [delivered to] . . . the filter membrane module 21 for 1 minute. That is, the gas pressurizing process was established." Nakatsuka further teaches that backwashing with gas was known in the art since at least 1995 and that the lessons provided by the art were used to invent a method of chemical washing that included a gas backwash. Nakatsuka, Translation, Detailed Description, ¶ 3, lines 1-5; ¶ 5, lines 1-3.

14. To summarize, Nakatsuka anticipates all limitations recited in claims 1 and 10.

15. Claim 2 recites all claim 1 limitations with different terminology to describe the application of gas during backwash. As such, the two patentability analyses are similar. To summarize, Nakatsuka anticipates all claim 2 limitations.

16. Claim 3 depends on claim 1 and recites a continuous process with a repetitive cycle of solid accumulation and removal. Nakatsuka discloses that a continuous process was run for eight months with a backwash cycle run once every 45 minutes for 1 minute. Nakatsuka, Translation, Detailed Description, ¶ 22, lines 9-16.

17. Claims 4-9 depend on claim 1 and recite using a chemical cleaning solution [claim 4] which is added either to the outside of the membranes [claims 5 and 7], the inside of the membranes [claim 6] or both sides of the membrane [claims 8 and 9]. Nakatsuka discloses, "The [cleaning] solution at the time of chemical washing may

circulate . . . from the raw water side to the penetration side. It may be made to pass from the penetration side of a filtration membrane to a raw water side." Nakatsuka, Translation, Detailed Description, ¶ 18, lines 10-13. The examiner replaced the translated "drug solution" with "cleaning solution" because in that same paragraph, lines 1-3, Nakatsuka also teaches, "In this invention, it can mention using the 'combination drug solution' which combined citrate and a surface-active agent for chemical washing as a kind or two sorts or more of examples for performing in combination." Nakatsuka further teaches that chemical washing solutions can be applied in one stage, multiple stages, and with gas backwash "suitably put among these washing[s] or into [any] order." Nakatsuka, Translation, Detailed Description, ¶ 18, lines 3-10. In summary, Nakatsuka discloses using a chemical cleaning solution [claim 4] which is added either to the outside of the membranes [claims 5 and 7], the inside of the membranes [claim 6] or both sides of the membrane [claims 8 and 9] with gas backwash suitably put among the washings in any order.

18. Claim 11 depends on claim 1 and recites removing at least part of the bulk liquid before the backwashing step. Nakatsuka discloses such removal can be done through open valve 7 in Figure 1 and open valve 38 in Figure 2.

19. In summary, Nakatsuka anticipates all limitations recited in dependent claims 3-9 and 11.

Claim Rejections - 35 USC § 102
Ford et al. Reference

20. Claims 1-5, 7, and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ford et al. (US Patent No. 4,931,186, Jun. 5, 1990).

21. Regarding claims 1 and 3, Ford et al. discloses, "A method of concentrating solids in a liquid suspension using a filter having a plurality of hollow, microporous . . . fibres with a shell or housing, comprising applying the suspension to an outer surface of the fibres whereby a portion of the suspension passes through the fibre walls and at least a portion of the solids is retained on or in the fibres; and discharging the retained solids by . . . washing out solids retained in the pores by application of gas under pressure." Ford et al. further teaches, "[D]ischarging the retained solid from the shell by applying through the fibre lumens . . . a pressurised gas . . . In one form of the invention, the application of the pressurized gas is initially conducted so as to backwash the full length of the lumens by displacing any lumen liquid with gas at a pressure below the bubble point of the walls of the fibres." Ford et al., Column 4, lines 17-18, 23-24, and 29-33. Ford et al. continues, "Preferably, the method of the invention is carried out as a continuous process utilising a repetitive cycle of solid accumulation and solid discharge." Ford et al., Column 4, lines 43-45.

22. To summarize, Ford et al. anticipates all limitations recited in claims 1 and 3.

23. Claim 2 recites all claim 1 limitations with different terminology to describe the application of gas during backwash. As such, the two patentability analyses are similar. To summarize, Ford et al. anticipates all claim 2 limitations.

24. Regarding claims 4-5 and 7, Ford et al. discloses, "[A] small slug of suitable surfactant may be applied to the feed suspension. . . . Example 4 . . . The fibres were previously wetted with a surfactant solution . . . The fibers were then backwashed by the small volume of clarified liquid in the clarified liquid line. . . . The air then followed for 10 seconds." Ford et al., Column 13, lines 47-48; Column 14, lines 1, 9-10, and 15-16.

Thus, Ford et al. teaches that the backwashing step includes a chemical cleaning solution [claim 4] that is applied to the outside of the membrane [claim 5] before application of the gas [claim 7].

25. Regarding claim 10, Ford et al. discloses, "Thus the combined pulsed permeate / gas pulse system of the invention is far superior to backwashing with permeate alone in known fashion." Thus, Ford et al. teaches that the gas is pulsed in its application to the membrane lumens, as recited in the claim.

26. Regarding claim 11, in Figure 4 and at Column 8, lines 9-16, Ford et al. discloses that liquid can be removed from the tank (concentrator 20) through valve 30 to point b labeled "a concentration collection point" prior to the backwashing step.

27. To summarize, Ford et al. anticipates all limitations recited in claims 4-5, 7 and 10-11.

Claim Rejections - 35 USC § 103
Ford et al., in View of Nakatsuka

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

29. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

30. Claims 6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over (US Patent No. 4,931,186, Jun. 5, 1990) as applied to claims 4 and 5 above, and further in view of Nakatsuka (Patent Pub. No. JP11076769, Mar. 23, 1999 – The esp@cenet Abstract in English, the publication, and a machine translation to English).

31. Ford et al. discloses the claimed invention except for adding the chemical cleaning solution to inside the membranes. As was shown above, Nakatsuka discloses using a chemical cleaning solution [claim 4] which is added either to the outside of the membranes [claims 5 and 7], the inside of the membranes [claim 6] or both sides of the membrane [claims 8 and 9] with gas backwash suitably put among the washings in any order. It would have been obvious to one having ordinary skill in the art at the time the invention was made, in the Ford et al. method, to have added the cleaning solution to the inside of the membranes or to both sides of the membrane as taught by Nakatsuka, since Nakatsuka states in the esp@cenet Abstract, lines 1-9 that cleaning solution in conjunction with a gas backwash is "capable of sufficiently removing an adsorbed

material to the filter membrane" and that the cleaning solution can be added to just the filtrate or to both sides of the membrane. Nakatsuka, Translation, Detailed Description, ¶ 18.

32. In summary, Ford et al., in view of Nakatsuka, discloses or suggests all limitations recited in claims 6 and 8-9.

Conclusion

33. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise R. Anderson whose telephone number is (571)270-3166. The examiner can normally be reached on Monday through Thursday, from 8:00 am to 6:00 pm.

34. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

35. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DRA

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797